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### DIPLOPODA FROM THE WESTERN STATES.

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FAMILY CALLIPODIDAE.

*Lysiopetalum mutans* sp. nov.

General color of body above dark brown to almost black; a narrow median line of yellow extending from the anterior margin of the second dorsal scutum to the end of the anal scutum; a broader pale stripe of darker caste than that of the median line along each side from the anterior margin of the first segment to the end of the body; lower portion of sides and the entire venter yellowish. Legs yellow on inner or ventral surface proximally, the distal articles commonly darker; dorsally brownish, likewise darker distally. General color of head brown; vertex areolate with dark-brown over a lighter ground; a smoky or blackish brown area between eye and antenna of each side and those of the other, the area narrowing to a median point down the front, the region each side of this elongation areolate like the vertex; clypeus and labrum light brown to yellow. Antennae deep brown or blackish excepting the two distal articles which are whitish.

Vertex of head crossed by a narrow median longitudinal furrow which is subdivided by a fine line-like elevation; head depressed transversely a little ventrad of bases of antennae; subdensely hirsute with short stiff hairs or setae which are somewhat longer in the clypeal region.

Gnathochilarium broad; greatest width of mentum  $3\frac{1}{2}$  times as great as the median length; lingual lamellae, exclusive of its processes, twice as long as the greatest width.

Eyes well developed, black, subtriangular; the ocelli numerous, compactly and seriatly arranged. Below eye area proper on each side is what appears to be an organ of sense; it is much larger than an ocellus, convexly elevated and transparent, the convex portion apparently covering a pit in which is a conical body like a sense-cone of the antennae.

Antennae long and moderately clavate; clothed with mostly short hair intermixed with some longer ones; length 2 mm.

Body gradually attenuated from near anterior end of caudal third of the length cephalad, more abruptly narrowed or constricted over several segments immediately caudad of the head. Dorsum depressed or sub-complanate, rather more convex cephalad than caudad. Sides sub-vertical. A fine median dorsal keel extending from the anterior margin of the second segment to the caudal end of body. Each side of the median keel upon the dorsum are three conspicuously elevated, sharp edged carinae which extend entirely across the segment and each of which bears at its caudal end a short clavate seta projecting dorso-caudad; laterad of the outermost of these dorsal keels is a much thicker keel with wide flat surface which bears a similar seta adjacent to caudal end; between each two of these major carinae is an intermediate lower carina which bears no seta; on the side ventrad of the thickened carina above mentioned are two additional, large setigerous carinae and between the thickened carina and the first and between the first and second of these a lower non-setigerous carina; while ventrad of the second are other lower carinae which become obscure ventrad. Segments anteriorly transversely furrowed, the carinae over and cephalad of the furrow lower and weaker but continuous. On the second, third and fourth segments the setae are not borne at caudal ends of the carinae but spring from tubercles contiguous with the carinae at or cephalad of their middles and extend vertically from the surface or nearly so; on the fifth segment are two series of setae, one consisting of setae along caudal margin as on more posterior segments, and the second more cephalad as on the preceding segments, the setae of the two series alternating.

Collum or first segment in outline half-moon shaped, the caudal margin being straight and the lateral and anterior margins together evenly convexly rounded or semicircular. Carinae extending only across the posterior half of the segment, the setae being borne at their cephalic ends. A second series of setae toward the cephalic margin.

Anal plate triangularly narrowed caudad, the posterior margin truncate or weakly widely rounded and bearing the usual two long setigerous papillae; anteriorly, longitudinally carinate; bearing transverse rows of setae of which the most caudal become longer and conspicuously and finely drawn out apically.

Anal valves smooth; an obliquely transverse, somewhat curved impression over caudal portion on each side; each valve bearing two pointed setae, one at the caudal edge and one at middle toward the mesal margin.

Anal scale transversely somewhat diamond shaped, the meso-caudal and meso-cephalic angles a little rounded; a longitudinal, somewhat incurved, impression crossing each side; bearing two pairs of finely pointed setae, one median and between the longitudinal impressions and the other near the caudal margin with each seta laterad of the impression of the corresponding side.

Distal article of first and second legs in the female with a comb- or calamistrum-like series of setae along the ventral surface, the setae being very closely and regularly set.

In the female the coxae of the second to eighteenth legs inclusive and of the twentieth or, as appeared in one specimen, of the second to nineteenth legs inclusive, bear on their caudo-ventral faces conspicuous, distally inflated, sub-fungiform outgrowths; the processes of the third legs, however, reduced to smaller, low convex elevations.

Oviducts of female protruding as greatly elongated appendages or ovipositors which when extended caudad reach the eighth segment of the body; distal portion of processes enormously enlarged, bearing very long stiff bristles; proximally glabrous; showing a tendency to segment into articles; color white.

Number of segments 49 to 53.

Length 26 mm. Width 1.5 mm.

Locality—Stanford, Cal. (W. M. Mann).

FAMILY CRASPEDOSOMIDAE.

*Conotyla deseretae* sp. nov.

Dorsum brown; a dark band of black or bluish black color along each side immediately ventrad of the carinae, the band commonly extending dorsad on the prozonites and sometimes, especially on the posterior segments, forming thus a band entirely across the dorsum; a median longitudinal dark band along dorsum, and this typically geminated throughout its entire length by a narrow light line. Venter and legs paler, light brown to yellowish. Head commonly a considerably darker, more reddish, brown than that of the body. Antennae deep brown to blackish.

Head widely and shallowly depressed or furrowed transversely between the eye patches. Evenly hirsute with short hairs.

Lingual lamellae of gnathochilarium with sides sub-parallel for most of length; their length, inclusive of processes, three times the greatest width. Lingual stili conspicuous, their lateral teeth distinct. Spatula large, distally broadly rounded. Stipites a little less than five times as long as the greatest width. Mentum with greatest diameter somewhat more than twice the greatest length; its anterior margin widely rounded; as a whole sub-semicircular in shape.

Eye patches triangular, the apex directed forward; ocelli 25, more or less, arranged mostly in seven series (6, 5, 5, 4, 3, 2).

Antennae long, of typical form and proportions; length 3.5 mm. See Pl. XXXI, fig. 8.

Body strongly narrowed caudad and cephalad, the first segment constricted in the usual way; a sharp, low, median keel extending along dorsum for its entire length, a narrow furrow impressed each side of the keel. Second segment short, the inner bristles relatively farther laterad than on the first, and these bristles located more and more distantly from the median line on subsequent segments back to the middle region of body. The lateral bristles, as usual, becoming directed more and more strongly caudad in proceeding from anterior segments posteriorly. Inter-segments or prozonal divisions in part encircled by a series of fine transverse impressed lines, the elevations between these crossed with fine striations.



First segment somewhat semi-circular or sub-reniform, the anterior median region extending into broad excavation of head. Carinae very weak, continuous with the finely raised line of cephalic margin. The inner bristle on each side more than one-third the distance from the distinct longitudinal median keel to the outer bristles. The two outer bristles of each side upon carina, extending dorso-laterad and the caudal one in a transverse line with the inner ones.

Anal scutum truncate caudad, but the caudo-lateral angles extended, the intervening margin widely set in.

Anal valves equalling the scutum; the caudal margin of each nearly straight or but little curved, distinctly raised; an impressed longitudinal line toward dorsal margin and a similar one toward the mesal; three bristles borne a little cephalad of the caudal margin, the uppermost of these being close to the anal scutum, and the lowermost near the middle line of the valve.

Anal scale trapezoidal, the caudal margin wide, widely weakly incurved; a long bristle borne near each caudo-lateral angle.

First two pairs of legs of male slender, six-jointed as usual; the claws large; without special protuberances, and with no roughenings on the distal articles.

Third legs stout and, like the subsequent ones, seven-jointed; the ultimate joint roughened over the ventral and ventro-lateral surfaces, except proximally, with rows of short transparent processes; femur swollen into a wide enlargement on the dorsal side.

Fourth and fifth legs of male similar to the third but with the dorsal face of femora not bulging.

Sixth legs of male like the fifth but the coxae bulging ventrad.

Seventh legs of male with coxae strongly bulging ventrad into prominent rounded processes as shown in the figure (Pl. XXXII, fig. 6).

Anterior pair of processes of male gonopods broad plate-like structures with teeth along mesal portion of distal edge; posterior pair large, strongly inclined caudad, a secondary, somewhat flattened, accessory division along proximal portion of caudo-lateral surface; a conical process springing from the base of each (see Pl. XXXI, figs. 4, 5, and 6.)

Eighth legs or accessory gonopods with the distal article strongly enlarged as usual, the basal article more than commonly elongate, and extended ventro-mesad into a conical process which bears distad a number of very long bristles; below the conical process the proximal joint is shallowly excavated for the reception of a rounded protuberance of the posterior gonopod of the corresponding side.

Length 23 mm.; width 2.9 mm.

Locality—City Creek, Mill Creek, Provo and other canyons of the Wahsatch Mountains, Utah.



***Conotyla coloradensis* sp. nov.**

Dorsum and sides brown, the prozonal divisions of segments somewhat lighter than rest; sometimes finely areolated with paler brown. Lower region of sides and the venter paler, light brown to yellowish. No black bands or spots. Legs yellowish proximally, the distal joints brown or marked with brown in spots and streaks. Antennae brown.

Head hirsute, the vertex more sparsely so than the frontal region.

Lingual lamellae of gnathochilarium widest anteriorly, incurved posteriorly, posterior arms a little divergent, three times as long as greatest width. Stipites five and a half or more times as long as the greatest width. Spatula conspicuous, distally subtriangular. Mentum one-half as long as greatest width.

Eye areas subtriangular, but with the sides convex; ocelli about 22, in five curved series, counting from outermost mesad as follows: 5,5,5,4,3.

Antennae very long, proportions as represented in Pl. XXXIII, fig. 2. Length 4.2 mm.

A fine median longitudinal keel over all segments excepting the last. Carinae increasing in size from the first caudad. Inner setae becoming relatively farther and farther from middle line in going caudad, these setae inserted in a wide longitudinal depression extending along each side, the dorsum between the depression a little convexly elevated. Setae, as usual, becoming directed more and more strongly caudad in proceeding from anterior to posterior segments.

First segment of the usual form, the anterior margin broadly extended cephalad mesally and fitting into excavation of head, the lateral portions of margin a little incurved. Carinae small, continuous with anterior margin of plate. Innermost bristle about one-third the distance from median to the edge of the carina of the corresponding side, in transverse line with the more anterior of the lateral bristles which is situated cephalad and considerably mesad from the posterior one, the latter close to the caudal margin. Segment considerably depressed or furrowed transversely, the inner setae located in this depression. Setae erect.

Anal scutum truncate caudad, the posterior margin weakly incurved.

Anal valves not equalling the scutum, widely rounded and broadly margined. The three bristles nearly equidistant, the most ventral three or more times as far from the ventral scale as the most dorsal is from the scutum.

Anal scale sub-trapezoidal, the lateral and cephalic margins weakly convexly rounded, the caudal distinctly incurved between the two long bristles.

Appendages of second segment of female conspicuous, strongly enlarged distad, the distal end with long bristles. A sub-lobe sheathing the cephalic surface of main appendage, this bearing long bristles apically. See Pl. XXXIII, fig. 7.

Locality—Colorado (T. D. A. Cockerell).

**Tingupa** gen. nov.

Antennae moderate, strongly clavate distally, the fifth article longest and much thickest, the third article second in length.

Eyes well developed, consisting of numerous ocelli (8-20) arranged subseriately.

Gnathochilarium with promentum well developed, triangular and moderately low.

Segments convexly arched dorsally and with well-developed carinae; dorsum covered with densely arranged, laterally compressed and in part conically pointed granules which extend to edges of carinae and on caudal segments may project as spinous processes from carinae and caudal margin of segments; setae moderate to long, clavate.

Segments in adult 30.

Type—*Tingupa utahensis* sp. nov.

Distribution—Two species known, the type from Utah and a second form, *Tingupa monterea*, from California.

The genus seems to have closest affinities with *Pseudotremia*.

**Tingupa utahensis** sp. nov.

General color brown, like that of the dead leaves among which it lives; in some with finer mottlings of paler color on sides. Venter pale. Legs from yellow or almost white to pale brown. Antennae brown, the articles often paler at distal ends.

Segments with major subdivision strongly granulate, the granules or scales mostly somewhat compressed laterally or elongate antero-posteriorly and closely arranged; similar but narrower elevations closely covering the dorsal portion of the minor subsegments; scales larger on posterior segments, series of larger ones with conical apices directed caudad as acute spinous projections. Segments mesally well arched, depressed immediately mesad of the carinae; entire dorsum weakly longitudinally furrowed, the furrow divided by a fine, at times almost obsolete keel. Segments bent cephalad laterally, the latero-cephalic margin widely rounded, the acute anterior angles situated close to body. Edges of carinae often appearing finely crenate or dentate from the presence of the projecting tubercles. All setae clavate, in proceeding from first to posterior segments the two lateral setae on each side become more extended in these directions, more strongly directed caudad and cephalad respectively, in some being horizontally extended in these directions.

Vertex of head crossed by a low, rounded, median longitudinal ridge; head also elevated along a line connecting the angles of the eyes; transversely depressed between bases of antennae; conspicuously and rather densely hirsute with moderately long stiff and erect hairs or setae.

Gnathochilarium with lingual lamellae inclusive of processes three and a fourth times as long as the greatest width. Stipites in length about 4.7 or a little less times the greatest width. Promentum moderate, triangular in general outline, the basal margin broadly angularly

excised. Mentum with distal border broadly angular, fitting into excision of promentum; greatest width apparently about three and a half times the mesal length, but the position of the sclerite and some difficulty in determining the proximal limit leaves room for some uncertainty.

Ocelli arranged in a narrowly sub-triangular patch, the apex directed mesad and toward that of the opposite eye; caudal margin shortest, a little convex, the dorsal margin convex near caudal margin and concave near apex or mesal angle, the ventral margin concave. Ocelli in four series, counting from ventral row dorsad as follows: 7, 6, 4, 3, giving all together 20 or thereabouts.

Antennae strongly clavate, the fifth article longest and thickest, the first three especially much more slender.

First segment clearly longer than the second, the cephalic margin mesally protruding, the lateral portions straight or but little concave. Caudal margin nearly straight, distinctly excised immediately mesad of carinal corners, the latter angularly projecting caudad or latero-caudad, the posterior of the two lateral bristles projecting caudo-dorsad and somewhat laterad from bottom of this excision. Depressed or widely furrowed longitudinally on each side between median line and the lateral margin, the anterior of the lateral bristles springing from the cephalic portion of its depression in a dorso-cephalic direction. The innermost bristle near cephalic margin and well toward the median, extending dorso-cephalad.

Anal scutum in outline as viewed from above somewhat trapezoidal, the lateral margins not strongly converging; caudad widely sub-truncate, the lateral angles somewhat rounded. Papilla on each side nearly midway between the median line and the lateral margin, bearing a long curved bristle. A pair of long bristles borne on weak elevations each side of the median line and half-way between caudal and cephalic limits; and each lateral margin with a long bristle arising from near anterior angle and a weak tooth or acute obtuse bristle midway between anterior and posterior ends.

Anal valves with caudo-dorsal angle sub-acute, apically but weakly rounded, the caudo-ventral angle obtuse. Each valve bearing three long bristles, a little within the ventro-caudal margin, these bristles projecting caudad, the most ventrad being at the obtuse caudo-ventral angle or extension and closer to dorsal scutum than to anterior end of free margin, the other two equidistant from this one, with the upper one closer to scutum than to median bristle.

Ventral scale bearing two long, caudally directed bristles.

Anterior pairs of legs, in female at least, with distal joint bearing beneath a conspicuous comb-like series of stout bristles. See Pl. XXXIII, fig. 8.

Appendages of second segment large and distinct. Two sub-cylindrical processes springing from a main plate or fold and extending ventro-cephalad, these processes translucent or transparent distally. See Pl. XXXIII, fig. 7.

Length 7-8 mm.



Locality—Mill Creek Canyon, Utah.

Found among dead leaves along the margin of a deeply shaded ditch on south side of canyon, the accumulation of leaves remaining very damp.

***Tingupa monterea* sp. nov.**

Dorsum dark brown, a row of light spots along each lateral margin, a spot being on edge of each carina, and two other rows, more or less evident, between this row and a pale median longitudinal line, the innermost row being close to the latter. Venter pale. Feet white or yellowish. Vertex of head dark brown, the other portions paler, yellowish. Antennae brown, the articles pale distally.

Segments bent first forward laterally and then again somewhat caudad distally, especially in case of the posterior segments, the lateral margins lying parallel with axis of body and not widely rounded or curved in mesad, the cephalo-lateral angles being in fact farther from the body than the caudal in most segments; a little incurved mesad of each caudo-lateral angle, but less conspicuously so than in *utahensis*. Segments, excepting first and last, with a fine longitudinal keel along mesal line. Carinae strongly developed and conspicuously extended laterad and meeting together rather closely; finely denticulate. Granules or scales covering the segments densely in compact rows, their conical apices projecting like minute spines, at times giving the appearance of hirsuteness when viewed parallel to surface of segment, the whole surface thus appearing finely spinose. Setae long and clavate, situated nearly as in *utahensis*.

Anterior margin of first segment bow-shaped, being mesally moderately curved cephalad or convex, then each side concave, and laterally again convex. Not mesally furrowed or keeled.

Anal segment as viewed from above with the sides strongly converging caudad, incurved; widely truncate caudad; a large mesal tubercle or elevation a little cephalad of caudal margin.

Anal valves appearing a little to exceed the scutum. Dorso-caudal angle widely rounded, the free margin first curving evenly ventrad and cephalad and then running straight cephalad parallel with the dorsal margin. Dorsal and ventral edges elevate, the caudal not so.

Head with vertex elevate, somewhat longitudinally rugose along caudal border. Conspicuously depressed on each side from base of antenna caudad, the antenna being inserted in anterior end of the furrow. Head densely hirsute with short setose hairs over entire surface, sometimes appearing a little sparser on vertex.

Eye area small; the ocelli numbering eight or thereabouts, arranged in three series, counting from above toward antenna, 3, 3, 2; the side of patch toward median and that toward dorsal surface subequal, each consisting of three ocelli, and the two lying at right angles to each other or nearly so.

Antennae short, strongly clavate, the fifth article decidedly longer and very much thicker than the third.

Gnathochilarium with lingual lamellae, inclusive of processes, about 3.8 times as long as the greatest width which is anteriorly. Stipites inclusive of processes, about 4.25 times as long as the greatest width. Greatest width of mentum apparently three times the length, though the caudal margin was made out with some uncertainty. Promentum distinct and well developed. Spathula evident. Stili not detected.

Size approximately that of *T. utahensis*.

Locality—Pacific Grove, California (June, 1902.)

***Caseya irritans* sp. nov.**

General color in alcohol light brown; indications of pale, whitish transverse bands, one across each segment, and of a row of whitish spots laterally. Venter and the feet yellowish. Head with the vertex pale, finely areolated in brown; frontal region brown, a distinct pale spot ventro-mesad of each antenna, the spot transversely elongate, and a median pale spot immediately dorsad of the inner ends of these two spots; clypeal region pale; labrum yellow.

Head widely excavated caudad. Vertex transversely elevated, smooth and shining in the specimen as at present, crossed by a faintly developed fine median longitudinal line. Frontal and clypeal region of head sub-complanate; a conspicuous transverse impression above clypeus, indented or bent dorsad mesally.

Eye patch elongated in a meso-ventral direction. Ocelli strongly developed, 13 in number and arranged in three series, which, counting from above toward antennae are as follows: 7, 5, 1; on one side the series appearing rather as four, 1, 6, 5, 1.

Antennae long and slender, scarcely clavate. The third article much longer than the fifth; the seventh much smaller than the sixth, being but little more than half its length.

Promentum moderately large, triangular; mentum a little less than three times as wide as the median length. Length of lingual lamellae, inclusive of processes, a little less than three times as large as the greatest width, which is caudad of the middle. Stipites, inclusive of processes, about 4.4 times as long as the greatest width. Sensory cones of outer process of stipes 5 or 6 in number, of inner process apparently 6. Stili not detected.

First dorsal scutum sub-reniform, the anterior median portion rather narrowly protruding. Caudal margin with lateral angles evenly rounded, the median portion almost straight, slightly obtusely indented at mesal line. A fine median longitudinal line impressed across caudal portion of plate. Lateral regions of segment marked with numerous fine oblique striae, there being similar striae on the anterior rounded median portion but these extending but little caudad.

Body fusiform, attenuated both caudad and cephalad.

Segments caudad of the first with numerous striae over sides beneath; on the second there are three striae above the obsolete shoulder-like bulging occurring where carina would usually be developed, on the

third four or five, the striae existing farther and farther dorsad on subsequent segments, from the fifth caudad extending completely across the dorsum. From the fifth segment to the ultimate a band-like area across dorsum marked apparently with coarser striae and distinctly delimited laterally; on the more caudal segments the band extending caudad a little beyond the usual limit of segments and presenting weak crenations or dentations, the band farther cephalad on segment in median and anterior region of body.

Anal scutum in outline as seen from above with sides converging caudad, nearly straight or but little incurved mesally; caudal margin mesally emarginate. Two impressions extending from anterior margin on each side of the middle and converging to meet in an acute angle at a mesal point on the caudal emargination of plate. Papillae slender, gradually acuminate.

Each anal valve crossed longitudinally over dorsal portion by two or three striations. The caudo-ventral edge nearly straight, margined. Length, 10 mm. Greatest width 1.5 mm.

Locality—Portland, Oregon (Aug., 1902). One female.

#### FAMILY STRIARIIDAE.

##### *Striaria nazinta* sp. nov.

Body uniform light brown in color. Legs yellow. Antennae white.

Body cylindrical, gradually attenuated cephalad as well as caudad.

First segment large, expanded on each side in a plate which extends cephalad over lateral portion of head. Mesally the front margin is straight or nearly so. Anterior border with a ridge-like elevation continuous laterally with edges of the lateral plates, the two ridges meeting in a mesal elevation and at an angle open cephalad, the surface of plate in front of this elevation obliquely descending to head, closely tuberculate. On main area of plate each side of the median line are six strongly elevated and relatively thin carinae of which the one nearest the meson is lower and begins farther cephalad than the next laterad; the farthest laterad of these carinae is much lower and shorter than any other and is the only one not attaining or nearly attaining the caudal margin. Laterad and cephalad of the carinae and to the very edges of the lateral plates, the segment is densely tuberculate. Between the carinae the granules are irregularly scattered, and relatively few, not in definite rows, though they may usually be regarded as representing two broken series in each interspace.

Second segment with twelve dorsal and dorso-lateral carinae in addition to the major lateral carinae, but crossing the entire width of the major sub-segment and, as on all subsequent segments, more strongly elevated at caudal ends. Lateral carinae or plates less strongly extended horizontally than the lateral plates of first but in general similar, the lateral portions less strongly granulate.

Third and subsequent segments with twelve dorsal and lateral carinae in addition to the lowermost pair, the latter not at all carried



out on horizontal plates or extensions like those of first two segments but reduced and comparable in size to the one immediately dorsad of it, and projecting cephalad instead of caudad as do the other carinae. These segments with only scattered and weakly developed granules, some appearing almost smooth. All marked with the usual fine median keel.

Anal scutum conspicuously granulate with strongly developed tubercles.

Anal valves not equalling the last dorsal scutum, narrow and elongate. Granulate with strongly developed tubercles similarly to the anal scutum.

Caudal margin of head straight, not at all excavated. Vertex of head transversely elevated, the lateral portions ridge-like, the ends abrupt and conspicuous, while the mesal portion of the elevation extends ventrad and narrows to a mesal point attaining the imaginary line connecting the bases of the antennae, in front of which extension the level is depressed. Vertex crossed by a narrow median longitudinal furrow. Entire head granulate, the lateral portions more coarsely so. Hirsute, more strongly so over clypeus and adjacent region.

Labrum set off by a transverse depression or furrow; lateral portions rounded; mesally with two conical teeth.

At each lateral end of transverse elevation of the vertex a small darkened area apparently representing an eye; but in the type specimen ocelli indistinct, three or four obscurely indicated areas apparently representing them, the granular character of the general surface making their certain identification difficult.

Antennae short; strongly clavate; appressed close to head and inconspicuous. Fifth segment longer and much stouter than the third; the seventh smaller than the sixth. Subdensely hirsute with short stiff hairs, the proximal articles rather more sparsely clothed.

First legs bearing along the cephalo-ventral surface a calamistrum-like row of stout setae, elsewhere with fine hairs which are more sparse on proximal joints. A moderate tuberculate elevation toward distal end of femur on ventral surface like those present in males of some craspedosomatids.

Other legs mostly but sparsely provided with hair; all tuberculate.

Length, 13 mm. Width, 1.2 mm., nearly.

Locality—Portland, Oregon (Aug. 1902). One female specimen.

#### FAMILY NYSTODESMIDAE.

#### **Fontaria tuobita** sp. nov.

Black, the carinal and lateral margins narrowly bordered with pale. Anterior portion of prozonites yellowish. Sometimes the black of the dorsum is in varying degrees supplanted with brown which encroaches in irregular streaks and spots. Sides paler, smoky yellow, the dark color more pronounced adjacent to bases of legs and on caudal segments or forming distinct bands down each segment in alternation

with the bands of yellow of the prozonites. Venter pale. Legs yellow. Vertex and frontal region of head dark, a background of yellow being closely covered with a network of black; clypeal and labial region yellow.

Head with median furrow of vertex sharply impressed, extending to an imaginary line tangent to the dorsal edges of the bases of antennae where it touches the mesal angle of an impression extending between antennae. Finely hirsute.

Antennae slender, rather short.

First dorsal plate a little narrower than the second. The lateral and cephalic margins together forming an even semicircular curve; caudal margins of carinae oblique, the intervening caudal margin of segment nearly straight. Mostly smooth and shining, finely rugose along cephalo-lateral border.

Dorsum well arched, the carinae somewhat depressed below the horizontal. Second segment with cephalo-lateral and caudo-lateral angles a little larger than rectangular, narrowly rounded. In subsequent segments the cephalic border adjacent to cephalo-lateral angles becomes more and more protruded cephalad, and the caudo-lateral angles become more and more produced caudad in an acute angle or process.

Anal scutum terminating in a cylindrical process which is curved ventrad and is truncate distally.

Anal valves strongly raised along free mesal margins.

Anal scale triangular, the lateral margins convex proximally, elsewhere nearly straight; caudal angle narrowly extended a little and rounded.

Ventral scuta transversely impressed, more strongly so on caudal segments; a little extended at a small elevation or process at base of each leg.

Gonopods of male with the coxae relatively large and stout, distad of this extending ventro-cephalad; narrowed distad and terminating in a blunt pointed process which curves mesad and a little ventrad and then toward apex bending back proximad. On the ventro-mesal surface at one-third the length from coxae, an acutely-pointed, blade-like process, which curving meso-ventrad and then distad crosses its fellow in the middle line. See further, Pl. XXXV, figs. 7 and 8.

Length, 19 mm. Width 4.5 mm.

Locality—Clouderoft, Sacramento Mountains, New Mexico (Sept. T. D. A. Cockerell).

#### FAMILY POLYDESMIDAE.

#### *Scytonotus piger* sp. nov.

Dorsum dark, sometimes of reddish caste. Venter but slightly or not at all paler than the dorsum. Legs uniform brown or yellow. Head and antennae dark brown.

Head roughened. Vertex crossed by a short median longitudinal impressed line. Hirsute with short stiff bristles which are rather uniformly arranged.

Antennae clavate. Moderately to sub-sparsely clothed with mostly short hairs.

First dorsal plate less in width than either head or second dorsal scutum but relatively wider than in *granulatus*. Somewhat semicircular in outline but at each side extended into a narrow carina which is dentate, there being commonly two major teeth of which the caudal has a minor or secondary denticle on its posterior edge and in front of the anterior of which are several small denticles. Front margin mesally sub-straight, laterally convexly rounded.

Depressed along the cephalic margin, the depression extending caudad mesally and narrowing to a furrow which again expands triangularly adjacent to the caudal margin. The segment elsewhere elevated. Densely covered with tubercles, the setae much as in *granulatus*.

Second segment with the lateral ends curved cephalad and embracing the first. Segment longer laterally than mesally. Bearing three transverse rows of large tubercles. Carinae with cephalic angles acute but caudally widely rounded; laterally showing eight or nine rather small crenulations, the incision between them shallow; no translucent margin such as is present in *granulatus*.

Subsequent segments gradually increasing in length and showing from three to five or six transverse rows of tubercles. Posterior angles of carinae becoming less widely rounded and extending farther and more acutely caudad, in the last few segments being a little produced. Lateral margins of carinae with small crenulations or teeth which for the most part are well rounded and not at all acute; teeth or crenulations numbering from eight to ten or twelve, the lesser number occurring on the spiraculiferous segments. Prozonites very finely and densely granulate.

Anal plate convexly elevated proximally, bearing separated rows of conically pointed tubercles; two tubercles projecting laterad at base or proximal end of the cylindrical apical portion of scutum, this portion being slightly depressed ventrad and apically rounded and bearing on caudal surface four setigerous tubercles.

Anal valves with mesal and caudal margins elevated and smooth. In some an irregularly oblong area over posterior portion of each valve roughened with sharply separated depressed areolae. A setigerous tubercle in furrow near caudo-mesal angle and a second similar one near middle of plate nearer mesal than dorsal margin.

Anal scale with caudal extension convexly rounded and bearing two setigerous tubercles. Lateral portions in outline something like that of the fore part of a shoe.

Length 12-13 mm. Width ad 2 mm.

Locality—Upper branches of Mill Creek Canyon, Utah.

A number of specimens were obtained about springs in upper side branches of the canyon. It seems to be close to *S. granulatus* though clearly distinguishable in numerous details.



**Polydesmus** (*Kepolydesmus* subgen. nov.) **anderisus** sp. nov.

Brown to dark reddish brown; carinae along lateral edges and above of lighter color, often yellowish, the pale bands commonly more distinct caudad and frequently extending mesad along the caudal margin of each segment; often some of the anterior segments are dorsally distinctly areolated with black, which may form a more solid transverse band along the cephalic margin excepting its lateral ends. Venter pale. Legs yellow or light brown. Head brown, a dark blackish band between the bases of the antennae, this band concavely excised on ventral side; labral region yellowish. Antennae darker than the legs, being concolorous with the dorsum of body.

Vertex of head crossed mesally with a sharply impressed, distinct longitudinal furrow. Vertex and frontal region sub-sparsely clothed with short setose hairs, the clypeal region more sparsely provided with longer hairs.

Antennae long; a little clavately enlarged distad.

Body gradually narrowed cephalad from about the twelfth segment, less strongly so caudad.

First dorsal plate scarcely narrower than the head inclusive of genae, its greatest width about 2.3 times the mesal length. Anterior margin mesally straight or nearly so, the lateral angles widely rounded. Caudal margin slightly and widely mesally incurved, laterally extending gradually cephalad to meet the lateral margin at a rounded angle. Entire border of margins depressed. A transverse impression caudad of the cephalic border, a broad median longitudinal depression extending from this to the depressed border along the caudal margin. The rows of minute setigerous granules distinct, somewhat uneven; but the main tubercles very obscure or not at all indicated. Segment finely roughened laterally. Each lateral margin with a single minute denticulation.

Second segment bent cephalad on each side. Antero-lateral corner sub-rectangular as is also the caudo-lateral, but the latter well rounded. Sharply margined laterally, caudally and also along lateral portions cephalically. Lateral margin of carina with one distinct denticle at antero-lateral angle and one or two faint or obsolete crenulations or denticles indicated farther caudad.

Third segment nearly as the second; but the anterior margin immediately mesad of the cephalo-lateral angle more rounded and with a small indentation.

From the second segment caudad the cephalo-lateral angle becomes more and more rounded and the caudo-lateral less and less so, the latter finally becoming somewhat produced though not acute. The produced caudo-lateral angle of the penult segment somewhat indented caudally. Segments dorsally depressed mesad of the carinae, the depression anteriorly bending obliquely cephalo-mesad. Carinae bent a little dorsad. Transverse furrow deep and distinct, extending across dorsum about half way from meson to each lateral margin. Tubercles not sharply delimited, but rather more distinct on caudal segments.

Anal scutum with four denticulations along each lateral margin, each of these teeth bearing a stout seta. Dorsal surface with transverse rows of setae. Caudal process of the scutum straight, bearing four long, finely pointed setae.

Ventral plates impressed with the usual transverse furrow and with a less distinct longitudinal one. Smooth except for a moderate clothing of hair.

Legs rather long and slender, the second article inflated.

In the male the first two pairs of legs are conspicuously smaller and the ultimate joint is clothed within with stout setae subseriately arranged, the row being more even and well marked on the second. Other legs on inner surface with rows of setigerous tubercles, the setae being short, otherwise with sparse short hair only, except on the proximal articles. Second legs showing a cone-shaped, apically truncate process on the ventral surface of coxa.

For structure of copulatory appendages of the male see Pl. XXXVII, figs. 2, 3, and 4.

Length of female, .26 mm. Width, 3 mm. Length of antennae ad 3.8 mm.

Locality—Kendrick, Idaho (W. M. Mann).

**Polydesmus** (**Kepolydesmus** subgen. nov.) **sontus** sp. nov.

Dorsum deep brown to almost black, the prozonites mostly paler; carinae yellow. Pleural region between carinae and the bases of the legs brown. First segment commonly darker than the adjacent ones, often black, the caudal and carinal borders and the minute setigerous granules yellowish. Venter and legs yellow. Head with the vertex dark brown to blackish, the dark area extending forward between the antennae as a narrow, median tongue-like band, the color commonly deeper at the base or proximal end of this band; sides of head dark, a yellow band between dark area of vertex and the sides extending obliquely forward over insertions of antennae to the yellow lower frontal and clypeal area. Antennae yellow to brown, the sixth and seventh articles commonly conspicuously darker, the seventh being black and the sixth dark brown to black.

Body gradually attenuated cephalad; over posterior portion with the sides subparallel excepting for the few last segments which are narrowed in the usual way.

Vertex of the head crossed longitudinally by a fine median impressed line which extends almost to an imaginary line tangent to the upper edges of the antennal sockets. Frontal and clypeal region clothed with setose hairs of moderate length, the vertex appearing glabrous or nearly so.

Antennae short, a little less than or at most equalling the width of the body. Scarcely clavate. Sub-sparsely hirsute, the hairs more dense on the flexed side.

First dorsal plate in outline semi-circular or half-moon shaped, but the caudal margin a little incurved. Wider than the head inclu-

sive of the genae. Anterior border margined. Carinae narrow; bent dorsad; lateral margin with a single emargination but with no real denticulation. Crossed by a fine median longitudinal line.

Second segment bent forward at the sides. The anterior angles of the carinae sub-rectangular, somewhat rounded, overlapped by the first plate. A small denticulation on outer side of the cephalo-lateral angle and two weak or obsolescent emarginations indicated farther caudad. Caudo-lateral angles not rounded, a little obtuse. Caudal margin of carina excavated or abruptly bending meso-cephalad. Carinae rather narrow, bent somewhat dorsad. Inter-carinal region of dorsum strongly elevated and convex as it is on subsequent segments.

Lateral margin of carina of third segment shorter than that of the second. Anterior angle rounded, the emargination caudad of it as on the second segment, the denticle in front of the emargination likewise low and rounded. Posterior angle rectangular or acute. Caudal margin of carina straight, extending cephalo-mesad without showing any curvature.

Fourth segment similar to the third but the lateral carinal margin longer, sub-equal to that of the first, and the caudal angle rectangular or slightly obtuse. Only the single anterior emargination indicated.

Fifth segment abruptly longer. Lateral carinal margin bulging laterad, being mesally very obtusely angular. Caudal angle obtuse and rounded. The anterior emargination very weak.

Sixth segment a little longer than the fifth, the lateral carinal margin but weakly and evenly convex. The emargination very faint.

Subsequent segments sub-similar but the emarginations not at all manifest. The caudal angles in proceeding caudad become more and more acute and finally extended or produced sharply. All but a few of the segments with the dorsal transverse sulcus sharply impressed and extending well toward the carinae where it becomes more indistinct. A median longitudinal impression which is distinct in front of the transverse sulcus which is mostly vague or absent caudad of it.

Anal scutum with the process truncate and apically the caudal end shallowly emarginate.

Anal valves with the caudal margin a little incurved, meeting the mesal margin at an acute but rounded angle. Mesal margin elevate. A short curved impression near the mesal margin of each valve and about the middle of its length, the concave side being mesad. A longer and also slightly curved impression toward dorsal margin, the concavity being dorsad or ectad.

Anal scale relatively long, the caudal border emarginate. Laterally weakly emarginate at proximal ends of sides.

Ventral plates with a longitudinal median impression which is distinct on the posterior segments but is indistinct or not at all evident cephalad. Transverse impression mostly very weak. All rather densely clothed with hair, some of which is conspicuously long.

Legs sparsely clothed with short stiff hairs which are most abundant on distal joints and on the ventral or inner side.



In the male the first legs are, as usual, small, but the second are not conspicuously reduced. The bristles on the ventral surface of the distal joint of first legs more densely and sub-seriately arranged than on the others.

Copulatory appendages of the male moderately small, strongly bent cephalad and parallel with the body. The main outer process of each side bearing distally three chitinous appendages. The most proximal of these is short and blade-like and extends dorso-mesad and a little cephalad, crossing with its mate at the middle line. The second takes its origin cephalad and dorsad of the first and as a long, conspicuous, flattened and somewhat twisted blade extends first cephalad and then curves ventro-mesad. The third takes its origin a little dorsad from the base of the second and curves first dorso-mesad and then ventro-mesad, the distal portion curving finally ectad again and ending in a slender acute point. From the ventral concavity of this appendage springs a slender process which bears distally a stout curved seta which extends caudad to end in the neighborhood of the first process. See further Pl. XXXVIII, figs. 2 and 3.

Length 19-20 mm Width 2.5 to 2.7 mm. Antennae ad 2.5 to 2.7 mm.

Locality—Los Angeles, Cal. (June, 1909.)

***Polydesmus amandus* sp. nov.**

Segments with the main dorsal divisions whitish, a tendency for the median area contiguous to the cephalic margin to be brown, the ultimate segments and a few of the most anterior commonly more or less completely brown; the prozonites clear brown. First dorsal plate clear brown. Venter white, excepting a few of the most caudal and of the most anterior segments which are brown. Legs white but with the coxae all brown and with a decided tendency for the distal articles likewise to be brown or brownish. Head uniform brown, the color being of a lighter shade than that of the first segment. Antennae uniform brown or with some of the median articles whitish in whole or in part.

Head nearly smooth, the vertex crossed longitudinally by a short median impressed line. Clothed rather densely over nearly the entire surface with very short hairs.

Antennae a little longer than the body is wide. Clavate, the sixth article being considerably the thickest.

First dorsal plate narrower than the head inclusive of genae and than the second segment. Transversely sub-elliptical. Lateral carinal margin with three teeth; a fourth tooth projecting from edge on the cephalo-lateral curve. Tubercles in numerous rows; strongly developed; apically acuminate and setigerous. The setae curved or frequently hooked distally. A transverse impression or sulcus cephalad of the row of tubercles along caudal border.

Second segment strongly bent cephalad at the sides. On the carinal margin immediately caudad of the acute denticle of the cephalo-lateral angle is a more obtuse one and caudad of this five larger, low

crenations which are continuous as a series with a row of crenations or projecting tubercles along the caudal margin; all are setigerous. Tubercles all strongly developed. Carinae sub-horizontal.

Carinal margin of the third segment rather longer than that of the second but similarly sculptured.

Subsequent segments becoming longer, the rows of tubercles they bear more numerous, the carinal crenulations weaker, and the caudo-lateral angles more rounded excepting in the last few where they tend toward rectangular. In the antepenult segment alone are the caudo-lateral angles a little produced. A transverse sulcus between the second and third or the third and fourth rows of tubercles from the caudal margin. Two longitudinal impressions, one a little each side of the median, extending from cephalic margin a short distance caudad and then curving out laterad. Wide spaces intervening between the carinae of adjacent segments.

Anal scutum bearing transverse rows of strongly developed, conical setigerous tubercles like those of other segments, these rows well separated from each other. Apical process of scutum decurved, conical, not truncate, and bearing long setae as usual.

Anal valves with the dorsal and mesal margins sub-parallel, the caudal margin meeting the mesal in a rounded but as a whole somewhat acute angle. A little cephalad of the caudo-mesal angles is a transverse impression crossing the median line from valve to valve. Mesal margins strongly elevated. A conspicuous conical and setigerous elevation near the middle of each valve, this elevation closer to the mesal than to the dorsal margin.

Anal scale with each half in outline like that of shoe with high instep. Caudal margin crenately incised a little mesad of each caudo-lateral angle, the crenulation adjacent to each angle bearing a long seta.

Ventral plates pilose. The transverse impression in most more strongly developed than the longitudinal.

Legs rather long, very sparsely hirsute proximally but more densely so distally. Second and third articles inflated dorsally.

The first legs reduced as usual, the second intermediate in size.

Gonopods of male of moderate size. Each one presenting two main chitinous processes of which the cephalo-mesal one is apically bidentate and presents near its base an acute conical tooth projecting in a cephalo-mesal direction. The second process lies against the first for most of its length but distally diverges from it, extending more directly ventrad and ending in an acute point. See further Pl. XXXVIII, fig. 6 and Pl. XXXIX, fig. 1.

Length of male 18 mm. Width 1.9 mm. Length of antennae 2+ mm.

Locality—Mill Creek Canyon, Salt Lake Co., Utah. (Sept., 1900).

***Polydesmus sastianus* sp. nov.**

Dorsum brown; the carinae paler, yellowish. Sides pale brown. Venter and legs yellow. Head light brown. Antennae light proximally, the distal joints brown.

Head finely roughened. The vertex crossed with the usual impressed line. Clothed rather densely with very fine short hairs.

Antennae short. Clavately thickened. Distal articles sub-densely clothed with moderately short hair; but with only a few hairs on the first and especially on the second articles. The four sense cones conspicuous.

First dorsal scutum narrower than the head and also distinctly narrower than the second segment. Transversely sub-elliptical with the caudal margin, however, but little convex. Tubercles strongly developed, conical, in crowded series. The setae conspicuous, those of the rows of tubercles along cephalic and caudal margins very long and, as usual, curved or hooked distally.

Second segment not strongly bent forward laterally. The conical tubercles strongly developed and densely arranged as on the first one. Carinal margin with the anterior and the posterior angles about equally rounded; laterally with six, large, angular, setigerous teeth, of which the most cephalic, which is located on mesal side of cephalo-lateral angle is smallest and most acute, the fourth and fifth with a secondary indentation on their cephalic edge and three similar teeth on caudal side. The series of teeth continued along the caudal edge of plate by a row of large projecting tubercles.

Third and fourth segments with their lateral margin shorter than that of the second; the caudo-lateral angle of carina more rounded; lateral margin with same number of teeth as the second.

On the subsequent segments the caudo-lateral corners of the carinae become more angular, first becoming sub-rectangular and then on the last two preceding the anal plate a little produced caudad. Entire dorsum with a longitudinal median keel-like elevation which is better developed on the prozonites. Transverse sulci rather weak.

Anal seutum strongly tuberculate, the tubercles conical and setigerous like those of the preceding segments. Caudal process narrowly rounded.

Anal valves somewhat as in the preceding form.

Anal scale sub-triangular. Caudal angle a little rounded. Seven pairs of setigerous tubercles along the lateral margins.

Most of the ventral plates are very distinctly marked both with the transverse and with the longitudinal impressions; of these impressions the longitudinal one is narrower and usually appears more sharply impressed.

Legs moderately clothed with rather short hair, the first two joints more sparsely so.

Length: 10-11 mm. Width 1.5 mm. Length of antenna ad 1.5-1.6 mm.

Locality—Shasta Springs, Cal. (Aug., 1909.)

Three specimens were secured, one adult female and two not fully grown males.



***Polydesmus socarnius* sp. nov.**

Dorsum brown; the carinae commonly paler; a median longitudinal dark line indicated in some, this more distinct caudad. Venter scarcely paler than dorsum. Legs yellow or light brown. Head brown, the genae and the clypeal and labial region paler, yellowish. Antennae brown, darker than the legs, but light distally.

Vertex of head crossed by the usual median longitudinal impressed line, this line extending to the angle between two furrow-like impressions which extend from the median ventro-laterad to the bases of the antennae. Head conspicuously longitudinally furrowed along each side in line with the antenna, the latter being inserted in the furrow. Somewhat finely rugose over vertex. Moderately pubescent with rather short hairs.

Antennae a little longer than the width of the body, clavate to the sixth joint, seventh article comparatively large, showing the usual sense cones distinctly. Clothed densely with mostly short hairs.

First segment wider than the head without the genae but distinctly narrower than the head inclusive of the genae and than the second segment. Transversely somewhat elliptical; the cephalic margin widely and but weakly convex; cephalo-lateral angles strongly rounded, the margin evenly curving to the middle of the lateral carinal edge where it ends on each side in the single obtusely angular tooth. Caudo-lateral corners of the carina sub-rectangular, the caudal margin of the carina being nearly straight, untoothed. A row of four contiguous tubercles adjacent to the caudal margin along its median portion. The median convex area of segment with tubercles weakly or but obscurely indicated.

Second segment bent cephalad laterally as usual; overlapped by the first plate. Lateral carinal margin with three strongly developed teeth of which the cephalic is most acute and of which the most posterior is at or but little caudad of the middle of the margin, the latter caudad of this tooth being straight or but little curved to the sub-rectangular caudo-lateral angle. Posterior edge of carina straight and untoothed. Three rows of tubercles which are not closely placed, the two first rows extending from carina to carina; the row along the caudal border consisting of six elongate and roundly conical tubercles, which project a little beyond the caudal margin and are widely separated from each other, the two more median ones being closer to each other than are any other two.

In the following segments a fourth tooth, at first ventral in position, occurs between the caudal angle and the median tooth of the carinal margin. The caudo-lateral angle becomes gradually more and more acute and extended caudad, on most of the segments being conspicuously produced. Most of the segments typically with a narrow longitudinal furrow adjacent to the carinal margin, a little mesad of this with a wider and deeper furrow and again a little farther mesad a second narrow furrow, there being between the large and more evident furrow and the narrower one each side of it a carina-like elevation which

is commonly rather conspicuous. Dorsum as a whole complanate. Carinae a little elevate dorsad.

Anal plate with distal process apically decurved.

Anal valves with the mesal edges strongly margined and elevated. The usual setae present.

Anal scale sub-triangular.

Ventral plates with the usual cruciform impression, the transverse furrow being the wider and deeper in most plates.

Legs clothed with short stiff hairs, this rather longer and more abundant on distal joints.

Length, 10–11 mm. Width, 1.3–1.4 mm. Length of antenna ad 1.6 mm.

Locality—Salt Lake City, Utah (June 23, 1900).

FAMILY PARAIULIDAE.

***Paraiulus zakiwanus* sp. nov.**

Color brownish red. The first segment clear reddish without darker markings; but most of the body subsequent to this with a row of black dots along each side, one to each segment, which on the more posterior segments is supplemented with an area of smoky or blackish which tends to extend or diffuse about the segment and thus much to darken it. No distinct median dorsal line and no light spots. Vertex of the head dark, a band between the eyes darkest, black; the head elsewhere reddish, the red intruding into lower border of the dark area in three semicircular incisions. Legs brown.

A sharply impressed furrow extending from the upper margin of the eye area mesad curving evenly mesad and then bending sharply back dorsad to meet its fellow at an angle on the mesal line; the median longitudinal line extending distinctly to this angle. A second impressed line a little cephalad of the caudal margin of the head, this line being bent forward at a sharp angle mesally. Head very finely rugose.

Eyes are large, sub-triangular, the ventro-lateral side and the caudal side convex, the mesal being concave. Ocelli 63-65, arranged in nine transverse series which, counting from above ventrad are as follows: 11, 10, 9, 9 (8), 7, 6, 5, 5 (4), 3.

First dorsal plate with the lateral margins not angularly produced beneath but nearly straight and subparallel with the axis of the body. Entire border of plate distinctly margined. Finely rugose or nearly smooth, not at all striate.

Second segment with four deep striae on each side beneath and on caudal division, the lowermost margining the lower edge.

Subsequent segments also deeply striate beneath, the striae well spaced apart.

Spiracles rather small; touching the transverse suture which is bent at their level.

In the male the sixth and seventh segments are moderately extended beneath the lower margin of the latter evenly convex in outline, not at all angular.

First legs of male strongly enlarged as usual. Uncinate. Inner surface covered with rounded tubercles which are arranged in transverse rows as shown in Pl. XL, fig. 4.

Second legs of the male with the coxae much enlarged in the usual manner; produced mesally into a long tongue-shaped process which distally is enlarged and sub-truncate and which extends ventro-cephalad between the legs of the first pair. Claw of legs small, concealed with hair which clothes the distal end of legs sub-densely.

First pair of gonopods in the male with the anterior division much shorter than the posterior, strongly and subquadrately enlarged distad and clothed densely with long hairs. The anterior branch with the more slender distal portion bent first mesad almost at right angles and then caudad parallel with the axis of the body, drawn out distally to a narrow, slightly rounded point, the lower margin of the mesally extending division irregularly toothed. See Pl. XL, figs. 1, 2 and 3.

Second pair of gonopods inserted a considerable space from the base of the anterior pair, above base curving forward parallel to the body and then curving ventrad in engagement with the inner branch of the first pair. From about the end of the first third of the length arises a slender process which in lateral view appears to terminate in a spear-shaped head, this process crossing the main branch in a caudo-dorsal direction. Main process terminating in two branches, a broad plate-like branch through which the duct opens and a more slender acute process springing from the ventral aspect of the former. See further Pl. XXXIX, figs. 6 and 7.

Width of body 2.6 mm. Length uncertain, the caudal end of the body missing.

Locality—Sacramento Mountains, New Mexico. (T. D. A. Cockerell.)

***Paraiulus tiganus* sp. nov.**

Deep brown to almost black. A yellow to white stripe encircling the body at junction of adjacent segments and a narrower line-like ring of same color encircling each segment near transverse suture. On the dorsum of each segment each side of the median and on the anterior portion of segment is a curved light line, the concavity of which is caudad. A dorsal median longitudinal line of black which is thickest on each segment between the mesal ends of the two curved light lines. A row of black dots along each side, there being a dot on each segment cephalad of the narrow light ring. Back of each black dot is a white one which encloses spiracle. First dorsal plate deep brown or blackish, a solid black band along the cephalic border which is extended caudad mesally, narrowly edged with pale. Vertex of head dark brown; clypeus and an area on each side embracing insertion of antenna and extending ventrad from it pale; eye patches and a triangular area between them and extending ventrad black, the median area including three light dots. Antennae blackish. Legs brown to yellow. Last plate like the first one, deep brown or blackish, narrowly edged with pale.



Head with a furrow-like depression between the two eyes, the fine median longitudinal line extending from this across the vertex.

Eye areas oval but with the inner ends obliquely truncate. Ocelli convex, arranged in eight transverse rows as follows, counting from above ventrad: 4, 8, 9, 9, 10, 11, 9, 5, making a total of 65, in the specimen described.

Antennae of medium length, slender.

Cervical plate large. A weak median longitudinal impression which is obsolete on anterior portion. Lower lateral portion impressed with a longer striation near and subparallel with margin and dorsad of this and extending from the caudal margin a second, short stria, one or two other similar ones sometimes indicated.

Other segments sharply striate beneath. Spiracles small, not touching the transverse suture which is sinuate at its level.

Anal scutum smooth. Distal portion triangular, the apex sharply angular, straight, not at all decurved.

Anal valves with the mesal margin elevated, setigerous.

Anal scale roughly triangular; each lateral side mesally convex; incurved adjacent to proximal and distal angles; cephalic margin widely convex.

Male: Gnathochilarium with stipes not produced mesally. The very large promentum obovate, a little crenately incised each side of the middle on distal margin and also proximad of each disto-lateral corner. Hypostoma free except laterally. See Pl. XL, fig. 6.

First legs of male strongly enlarged, uncinat. The inner surface tuberculate as usual, and bearing long bristles as shown in the figure.

Second legs of male reduced excepting for greatly enlarged coxae, as usual; the claws small. See Pl. XL, fig. 7.

Gonopods of male large and conspicuously exposed. The anterior pair with the mesal branches a little the longer, attenuated from the base distad but produced caudo-laterally near or a little below its middle height. Outer branch clavately enlarged distad, embracing the first on the antero-lateral surface; pilose with long hairs over the distal end and proximally along the disto-mesal face for part of the length.

Posterior gonopods with the outer distal branch somewhat clavate apically and densely pubescent with fine short hairs. Inner branch almost straight, blade-like, acutely pointed. From the inner edge of the outer branch springs a third, spine-like, process which extends distad between the two main ones. See Pl. XL, fig. 8, and Pl. XLI, figs. 1, 2, and 3.

Length of a male 55 mm. Width 3 mm. Length of antenna ad 3 mm. Number of segments 51-57.

Locality—Canyons of the Wahsatch Mountains, Utah.

The most common diplopod in Utah. It is evidently closely allied to *P. furcifer*, which it resembles much in general appearance and in the general type of gonopods in the male. The latter are readily to be distinguished, however, both from characters in the anterior pair and especially those of the pos-

terior pair which differ in ending in three processes instead of in two, a slender spinous process appearing between the two major ones which are alone present in *P. furcifer*, etc.

***Paraiulus furcifer* Harger var. *sinampus*, new.**

A row of small dark, inconspicuous dots along each side toward dorsum, the dorsum above and between the two rows of dots light yellowish brown, the sides below the dots distinctly darker, brown; each segment with a dark blackish brown to black annulus which is broadest across dorsum and narrows ventrad down each side; a narrower and rather less deeply colored dark line along junctions of adjacent segments which below disappears in the brown of the sides. A fine median dorsal dark line, on each side of which on each segment is a yellowish white line which does not extend laterad as far as the line of dark dots. First dorsal plate dark brown or chestnut, especially the caudal border pale. Penult and antepenult segments and the proximal portion of anal scutum pale. Venter pale. Legs medium brown. Vertex of head black, the dark area extending ventrad between the antennae; clypeal and lateral regions of head pale. Antennae black or blackish.

Body in the not fully adult male being described somewhat constricted caudad of head, the first segment narrower than the second and subsequent ones.

First segment moderate; the lateral margins running obliquely from caudal edge of head ventro-caudad to junction with posterior margin which curves forward to angle. Lower lateral portion of plates marked with two distinct striae which extend forward a short distance from the caudal margin, in addition to the line margining the lateral edge. Caudal border not margined, the anterior one obscurely so.

Second segment with the lower lateral border extended ventrad mesally in an acute angle of which the cephalic side is much the longer. Deeply striate beneath, above somewhat roughened, as on subsequent segments.

Spiracles more or less elongate longitudinally, moderate, separated from the transverse suture which is somewhat weakly quadrately emarginate opposite them.

Anal plate not roughened. Distal portion subtriangular, straight, apically somewhat rounded. Extending a little beyond the anal valves.

Anal valves with mesal edges narrowly margined, not elevate. Each valve with a longitudinal impression ectad of its middle.

Anal scale subtriangular, the caudal angle acute, not at all rounded.

Legs rather long. Dorsally glabrous. Inner surface with longitudinal series of stout, spinescent setae.

Head roughened with areolations formed by a network of impressed lines. A bow-shaped line impressed between inner angles of the two eye areas, the line angularly bent dorsad at middle where it is joined by the median longitudinal line of the vertex. A wide, shallow, median depression from frontal region to clypeus which is deepest ventrad. Head furrowed below eye area on each side from base of antenna toward gena and then dorsad along the border of the head.

Eye area large, subtriangular, the dorso-mesal and ventro-lateral sides convex and the ventro-mesal nearly straight. Ocelli arranged in eight straight transverse rows which, counting from above ventrad, are as follows: 8, 10, 9, 8, 7, 6, 5, 3, making a total of 56.

Antennae slender, a little enlarged distally, the sixth article thickest. Clothed with short hairs intermixed with longer ones, the hair more dense distally.

First legs of male thickened, but as yet straight and not distally hamate. Coxae fused in middle line. See Pl. XLI, fig. 8, and Pl. XLII, fig. 2.

Second legs not as yet reduced, as large as the third but the four distal articles forming a hook which seems firm and is directed cephalad. Claw large.

Lower margin of seventh segment but slightly angularly extended. Gonopods enclosed in a single sheath, the body being very long and presenting indications of the separate pieces only distally. See Pl. XLI, figs. 5 and 6. Upon removal of the envelope the copulatory organs are revealed in their usual character and relations, but the posterior pair not yet engaged distally with the inner branches of the anterior pair as in the adult furcifer, its two prongs being straight and closely appressed together and the outer one distally pilose. Outer branch of anterior pair provided with long hairs as in the adult furcifer.

Number of segments 58.

Locality—Portland, Oregon (1902).

The description above is of a male which as indicated previously, is not wholly mature, although apparently or probably within one moult of being so. While the copulatory organs when released from the peculiar sheath are seen to be fully formed and in most respects in close agreement with those of typical furcifer, the coloration is markedly different from that usually found in *P. furcifer* of the corresponding age. Furthermore, an adult female collected at the same time has precisely the same coloration and differs from furcifer. It has seemed best to designate the form for the present at least, therefore, as a distinct variety. Because of the interesting points presented the young male is described in full and illustrations of a number of its features presented.

#### FAMILY PAEROMOPIDAE.

##### *Paeromopus lysiopetalinus* Karsch.

Figures of this interesting form, so long obscure as to its affinities because of incompleteness of the original description and lack of specimens in collections, are presented in Plate XLII, figs. 3 to 5, and in Plate XLIII, figs. 1 to 3. The author has specimens of this form from Portland, Oregon, and from Pacific Grove and Stanford, California.



## FAMILY CAMBALIDAE.

*Paiteya*, gen. nov.

Eyes fairly well developed, consisting of a moderate number of ocelli arranged in two or more rarely in three transverse series.

Antennae short, a little clavately thickened distad. Second article longest, the sixth next; the others much shorter, the third, fourth and fifth not much differing in length. The four sensory cones slender and moderately long.

Gnathochilarium narrowest proximally. Promentum elongate, triangular completely separating the laminae linguales which are strongly narrowed proximad.

Body iulus-like in general form. All segments striate beneath; dorsum of segments from the fourth to the antepenult, not inclusive, each with a series of strongly developed keels of which the most ventrad on each side is thickened and bears on the enlarged caudal portion of edge the spiracle.

Legs definitely armed with spiniscent bristles.

First legs of male reduced; with six articles; normally armed.

Second legs of male likewise reduced but otherwise normal in structure.

Type—*Paiteya errans* sp. nov.

Distribution—Southern California.

*Paiteya errans* sp. nov.

Brown in transverse encircling bands which, except on anterior segments, alternate with paler yellow bands which are broadest on dorsal surface and increase in extent on posterior segments; fifteen or so of the segments immediately following the fourth with an oval pale spot enclosed in the dark band laterally, these spots on posterior segments becoming confluent on the caudal side with the yellow of the adjacent yellow stripe; first four segments usually unmarked laterally with any such pale spots. A row of black spots on each side in line with the spiracles and extending caudad as far as the antepenult segment, not inclusive; these dark spots sharply defined excepting on the most anterior segments where they tend to be more diffuse and commonly enclose a paler area. First four segments commonly with a pale transverse band on dorsum, this band narrow at mesal line and expanded laterally, commonly areolated with dark. All dorsal carinae dark along their edges. Anal scutum brown excepting the caudal portion. Venter, legs and antennae yellow. Vertex crossed by a transverse yellow band which expands about the black eye area on each side. Between eye and antenna of each side and those of the opposite is a broad brown area which is often areolated with pale. Head below this latter dark band yellow.

Body constricted caudad of head, most strongly so over from about fourth to ninth segments.

Eyes in adults with ocelli in two rows which run a little oblique to the lateral portion of front margin of the first segment, which covers several of the more caudal ocelli. Ocelli commonly about nine arranged with the greater number in the dorsal series, thus: 6, 3; occasionally a single eye in a third row. Eye area extending almost transversely.

Antennae short. A little clavately thickened. The second and sixth articles longest; others distinctly longer than broad. Proximal articles sparsely provided with hairs of moderate length, especially toward the distal ends, the distal articles more densely clothed.

Gnathochilarium conspicuously broader distally than proximally. Lingual lamellae completely separated by the long, triangular promentum. Laminae strongly narrowed proximally, 2.75 times as long as the greatest width. Mentum toward proximal border with a sharply outlined semi-circular impression which has its concavity distad; wider at base than the median length in the ratio 11:9. Stipites nearly 3.5 times as long as the greatest width, the processes being included. In one specimen the processes of stipes were apparently completely fused together as shown in Pl. XLIII, fig. 4.

First segment nearly as long dorsally as the second and third taken together. Extending over the caudal portion of head. Posterior margin straight. Lateral margins widely rounded from caudo-lateral angles cephalo-mesad. The cephalic margin substraight mesally. Within each lateral margin several longitudinal striae extend cephalad from the caudal margin a mostly short distance.

Second segment with deep striae below, the striae on subsequent segments extending farther dorsad, on all but the most anterior and the most posterior reaching the lateral carina which is borne on all but the first segments. Spiracles beginning on the fifth segment. Dorsum of segments from the fourth to the antepenult (not inclusive) each with six strongly developed carinae, of which the lowermost on each side is conspicuously thickened. A weak, fine median keel along dorsum.

Anal scutum large, smooth, caudally rounded.

Anal valves exceeding the anal plate, the free margin thickened.

Legs without true hairs; but armed with definitely arranged spines or spinescent bristles. Claws very large, each armed with a well-developed spine springing from its base on the ventral side.

In the male the first two pairs of legs are reduced, but otherwise unmodified, having six articles and being normally armed.

Gonopods of male concealed excepting for the distal end of slender curved process which projects caudad on each side from beneath a covering plate.

Number of segments 47-49.

Length 19 mm. Width 1.4 mm.

Locality—Southern California.

## EXPLANATION OF PLATES.

## PLATE XXX.

*Lysiopetalum mutans* sp. nov.

- FIG. 1. Gnathochilarium. X 70.  
 FIG. 2. Antenna. X 70.  
 FIG. 3. Eye. X 70.  
 FIG. 4. "Ovipositor", lateral aspect. X 39.5.  
 FIG. 5. The same, cephalic aspect. X 39.5.  
 FIG. 6. First legs, caudal aspect. X 47.  
 FIG. 7. Second legs, cephalic aspect. X 39.5.  
 FIG. 8. Third legs, caudal aspect. X 39.5.  
 FIG. 9. Fourth legs, caudal aspect. X 39.5.  
 FIG. 10. Fifth legs. X 39.5.

## PLATE XXXI.

*Lysiopetalum mutans* sp. nov. (cont.)

- FIG. 1. Ninth leg, caudal aspect. X 39.5.  
 FIG. 2. Thirteenth leg, caudal aspect. X 39.5.

*Conotyla deseretae* sp. nov.

- FIG. 3. First legs of male.  
 FIG. 4. Gonopods of male, caudal aspect.  
 FIG. 5. Gonopods of male, cephalic aspect.  
 FIG. 6. Gonopods of male, lateral aspect.  
 FIG. 7. Eighth legs.  
 FIG. 8. Antenna.

## PLATE XXXII.

*Conotyla deseretae* sp. nov. (cont.)

- FIG. 1. Second legs.  
 FIG. 2. Third legs.  
 FIG. 3. Fourth legs.  
 FIG. 4. Fifth legs.  
 FIG. 5. Sixth legs.  
 FIG. 6. Seventh legs.  
 FIG. 7. Gnathochilarium.

*Conotyla coloradensis* sp. nov.

- FIG. 8. Appendages of second segment of the female.  
 FIG. 9. Eye.

## PLATE XXXIII.

*Conotyla coloradensis* (cont.)

- FIG. 1. Gnathochilarium. X 39.5.  
 FIG. 2. Antenna. X 87.  
 FIG. 3. Seventh article of antenna, more highly magnified.

*Tingupa utahensis* gen. et sp. nov.

- FIG. 4. Antenna. X 70.  
 FIG. 5. Eye. X 87.  
 FIG. 6. Eye of an immature specimen. X 87.  
 FIG. 7. Female appendages of the second segment.  
 FIG. 8. First legs of female. X 70.

## PLATE XXXIV.

*Tingupa utahensis* gen. et sp. nov. (cont.)

- FIG. 1. Gnathochilarium. X 87.  
 FIG. 2. Caudal end of body, dorsal view. X 47.



*Tingupa montereana* gen. et sp. nov.

- FIG. 3. Eye. X 87.  
 FIG. 4. Antenna. X 87.  
 FIG. 5. Gnathochilarium. X 70.

*Caseya irritans* sp. nov.

- FIG. 6. Eye. X 87.  
 FIG. 7. Head and first six segments, lateral aspect.  
 FIG. 8. Caudal end of body, dorsal view. X 18.5.  
 FIG. 9. Antenna. X 33.

## PLATE XXXV.

*Caseya irritans* sp. nov. (cont.)

- FIG. 1. Gnathochilarium. X 70.

*Striaria nasinta* sp. nov.

- FIG. 2. Antenna. X 70.  
 FIG. 3. First legs. X 47.  
 FIG. 4. Gnathochilarium, basal sclerites not shown. X 87.  
 FIG. 5. Labrum. X 70.  
 FIG. 6. First segment, caudal aspect. X 39.5.

*Fontaria tuobita* sp. nov.

- FIG. 7. Gonopods, cephalic aspect. X 47.  
 FIG. 8. Gonopods, caudo-ventral aspect. X 47.

## PLATE XXXVI.

*Scytonotus piger* sp. nov.

- FIG. 1. First segment in outline from dorsal aspect. X 33.  
 FIG. 2. Carina of fourth segment from the ultimate. X 70.  
 FIG. 3. Carina of fifth segment from the ultimate. X 70.  
 FIG. 4. Gnathochilarium (proximal portion not shown). X 47.  
 FIG. 5. Antenna (proximal article not represented). X 39.5.

*Polydesmus* (*Kepolydesmus* subgen. nov.) *anderisus* sp. nov.

- FIG. 6. Antenna.  
 FIG. 7. First leg of male. X 22.  
 FIG. 8. Second legs of male. X 22.  
 FIG. 9. Head and first segment in outline, dorsal aspect. X 22.

## PLATE XXXVII.

*Polydesmus* (*Kepolydesmus* subgen. nov.) *anderisus* sp. nov.

- FIG. 1. Third legs of male, caudal aspect. X 22.  
 FIG. 2. Gonopods of male, caudal aspect. X 33.  
 FIG. 3. Gonopods of male, cephalic aspect. X 33.  
 FIG. 4. Gonopods of male, lateral aspect. X 33.

*Polydesmus* (*Kepolydesmus*) *sontus* sp. nov.<sup>v</sup>

- FIG. 5. Antenna. X 33.  
 FIG. 6. First segment in outline, dorsal aspect. X 22.  
 FIG. 7. First legs, caudal aspect. X 33.

## PLATE XXXVIII.

*Polydesmus* (*Kepolydesmus*) *sontus* sp. nov. (cont.)

- FIG. 1. Fifth legs, caudal aspect. X 33.  
 FIG. 2. Gonopods of male, caudo-ventral aspect. X 47.  
 FIG. 3. Gonopods of male, lateral aspect. X 47.

*Polydesmus amandus* sp. nov.

- FIG. 4. Antenna. X 33.  
 FIG. 5. Head and first two segments in outline, dorsal aspect. X 33.  
 FIG. 6. Gonopods of male, lateral aspect. X 70.

## PLATE XXXIX.

*Polydesmus amandus* sp. nov. (cont.)

- FIG. 1. Gonopods of male, cephalo-ventral aspect. X 47.

*Polydesmus sastianus* sp. nov.

- FIG. 2. Head and first two segments in outline, dorsal aspect. X 33.

- FIG. 3. Antenna. X 44.

*Polydesmus socarnius* sp. nov.

- FIG. 4. Head and first two segments in outline, dorsal aspect. X 39.5.

- FIG. 5. Antenna. X 33.

*Paraiulus zakiwanus* sp. nov.

- FIG. 6. Posterior gonopods of male, lateral aspect. X 33.

- FIG. 7. Posterior gonopods of male, cephalo-dorsal aspect. X 33.

## PLATE XL.

*Paraiulus zakiwanus* sp. nov. (cont.)

- FIG. 1. Anterior gonopods of male, cephalic aspect. X 33.

- FIG. 2. Anterior gonopods of male, caudal aspect. X 33.

- FIG. 3. Anterior gonopods of male, lateral aspect. X 33.

- FIG. 4. First legs of male, cephalic aspect. X 18.5.

- FIG. 5. Second legs of male, caudal aspect. X 33.

*Paraiulus tiganus* sp. nov.

- FIG. 6. First legs of male, cephalic aspect. X 18.5.

- FIG. 7. Second legs of male, caudal aspect. X 33.

- FIG. 8. Posterior gonopods of male. X 22.

## PLATE XLI.

*Paraiulus tiganus* sp. nov. (cont.)

- FIG. 1. Anterior gonopods of male, cephalic aspect. X 18.5.

- FIG. 2. Anterior gonopods of male, caudal aspect. X 18.5.

- FIG. 3. Anterior gonopods of male, lateral aspect. X 18.5.

- FIG. 4. Gnathochilarium of male. X 22.

*Paraiulus furcifer sinampus* var. nov.

- FIG. 5. Distal portion of sheath of gonopods in immature male, cephalic aspect. X 33.

- FIG. 6. The same, lateral aspect. X 33.

- FIG. 7. Gnathochilarium of same specimen.

- FIG. 8. First and second legs of same specimen, lateral aspect. X 33.

## PLATE XLII.

*Paraiulus furcifer sinampus* var. nov. (cont.)

- FIG. 1. Labrum. X 70.

- FIG. 2. First legs of same specimen, caudo-ventral aspect. X 33.

*Pacromopus lysiopetalinus* Karsch.

- FIG. 3. First legs of male, caudal aspect. X 18.5.

- FIG. 4. Posterior gonopods of male, cephalic aspect. X 18.5.

- FIG. 5. Anterior gonopods of male, cephalic aspect. X 18.5.

## PLATE XLIII.

*Pacromopus lysiopetalinus* Karsch (cont.)

- FIG. 1. Gnathochilarium. X 18.5.

- FIG. 2. Antenna. X 18.5.

- FIG. 3. Second legs of male, showing penial process. X 18.5.

*Paiteya errans* gen. et sp. nov.

- FIG. 4. Gnathochilarium. X 70.

- FIG. 5. Eye. X 87.

- FIG. 6. First legs of male, cephalic aspect. X 75.

- FIG. 7. Antenna. X 47.